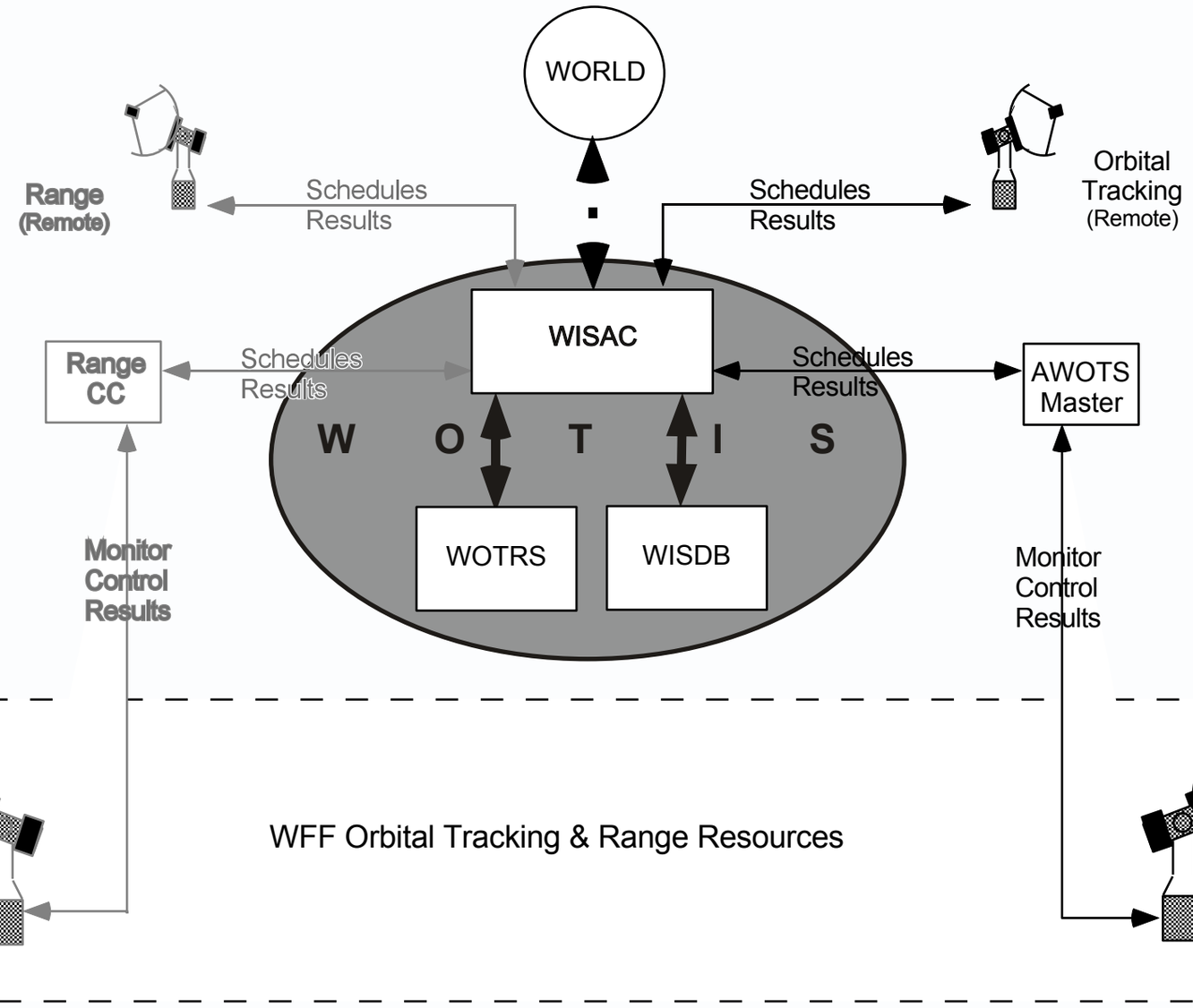
W O T I S

Wallops Orbital Tracking Information System

Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, VA

Wallops Orbital Tracking Information System - WOTIS
Context Diagram

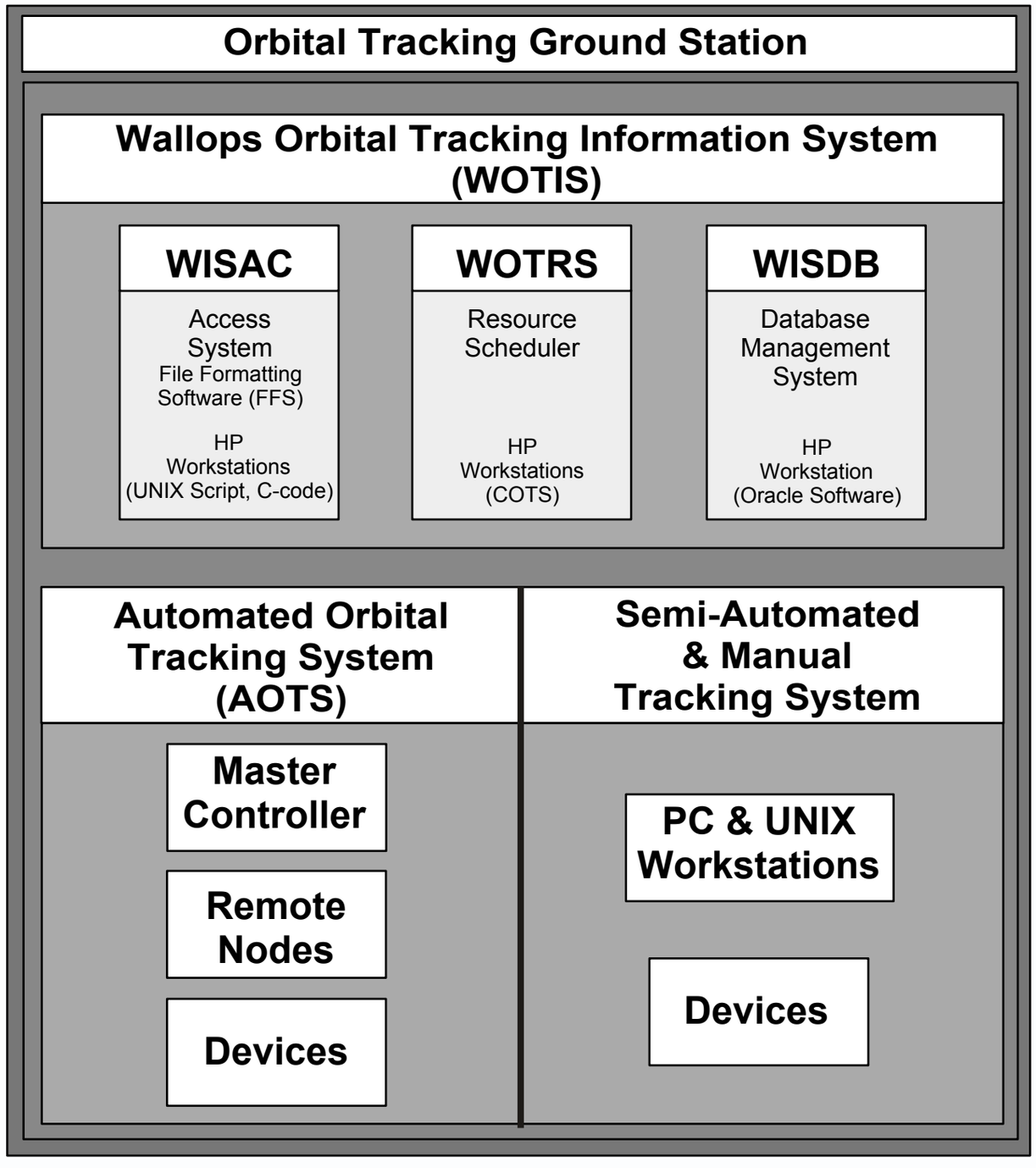


Wallops Scheduling Group

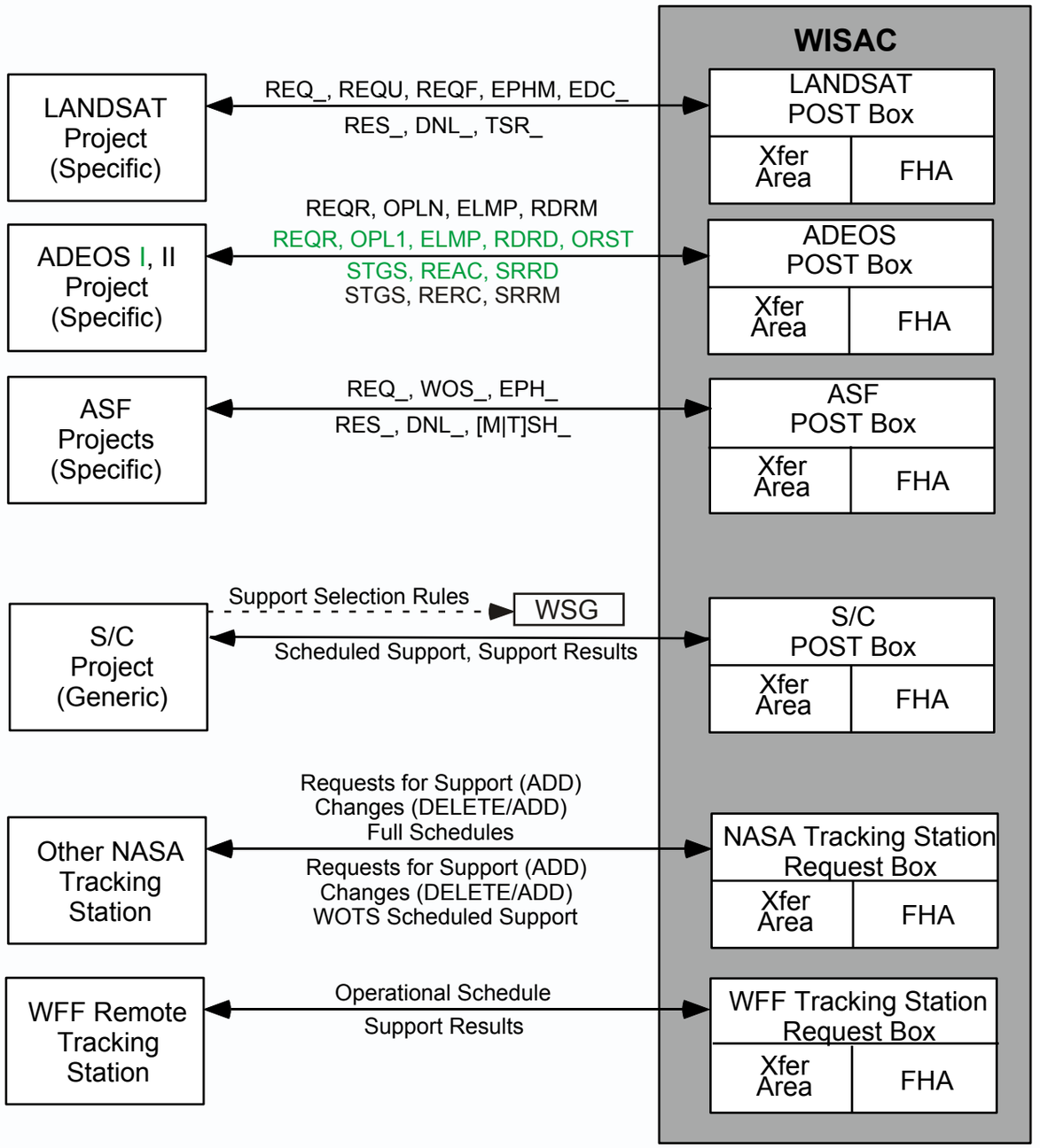
Ground Station Resources

- **Wallops Ground Station (WGS)**
  Wallops Island
- **Alaska Ground Station (AGS)**
  Poker Flat Research Range
- **McMurdo Ground Station (MGS)**
  Ross Island, Antarctica
- **Isbjorn Ground Station (SGS)**
  Svalbard, Norway

Wallops Orbital Tracking Information System (WOTIS)

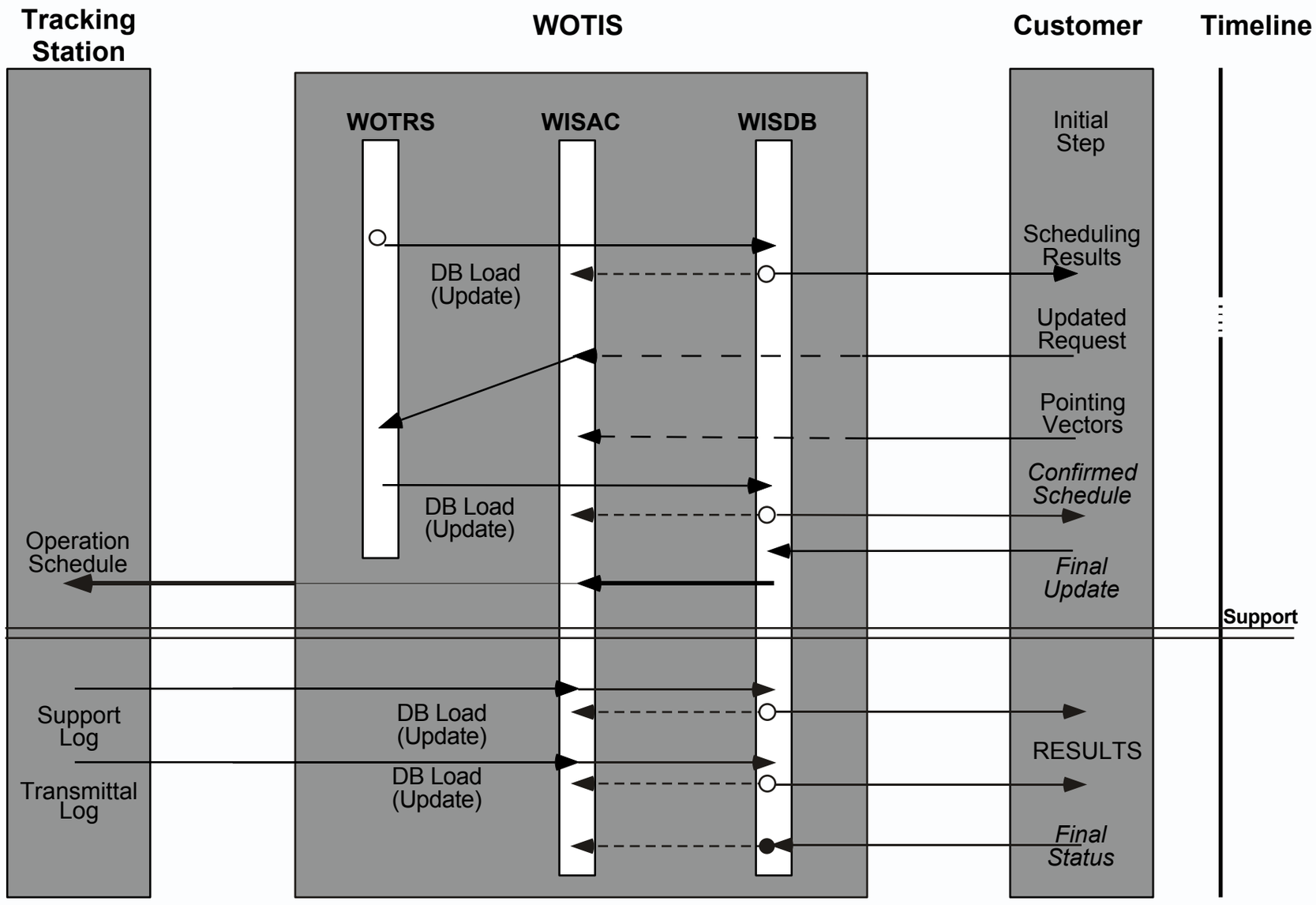


Wallops Orbital Tracking Information System (WOTIS)
Access System Interfaces



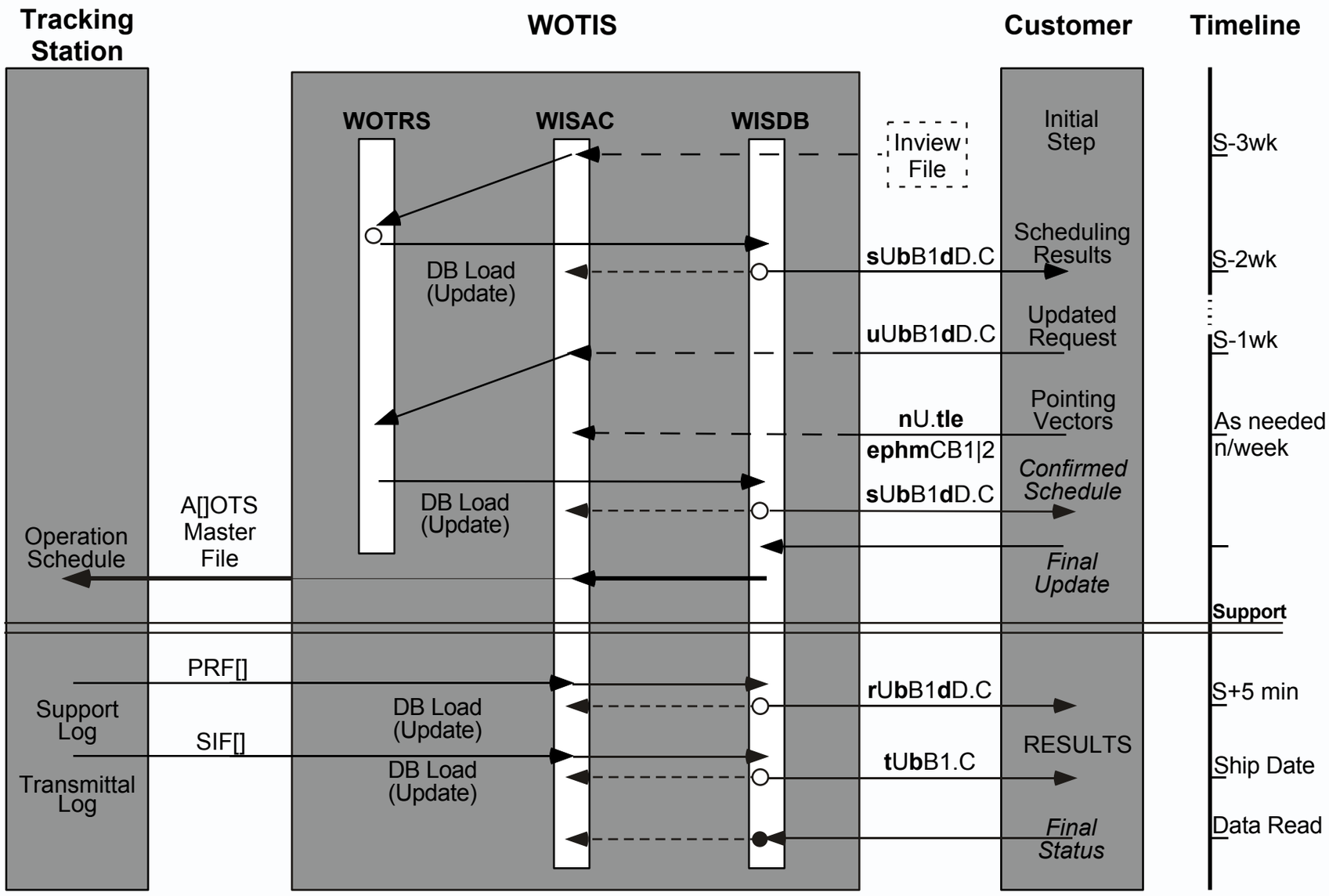
POST Box = Project Office Scheduling Transfer Box
FHA = File Holding Area

Wallops Orbital Tracking Information System (WOTIS) Operation



Wallops Orbital Tracking Information System (WOTIS) Operation

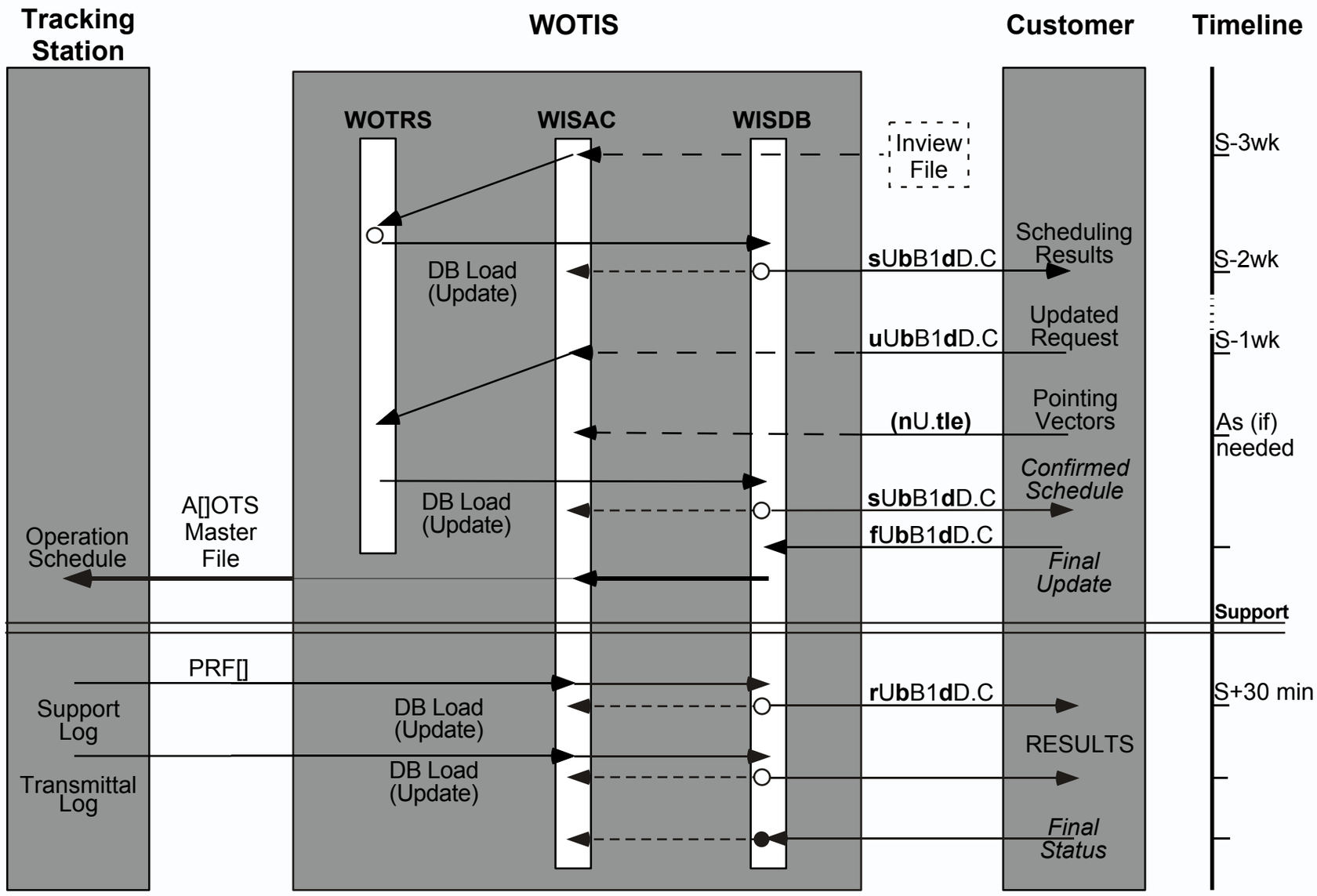
Generic



U = 3 Char Designator
B1 = YYYYDoY, B2 = YYYYMMDD
D = Duration in days
C = File Creation Time (hhmmss)

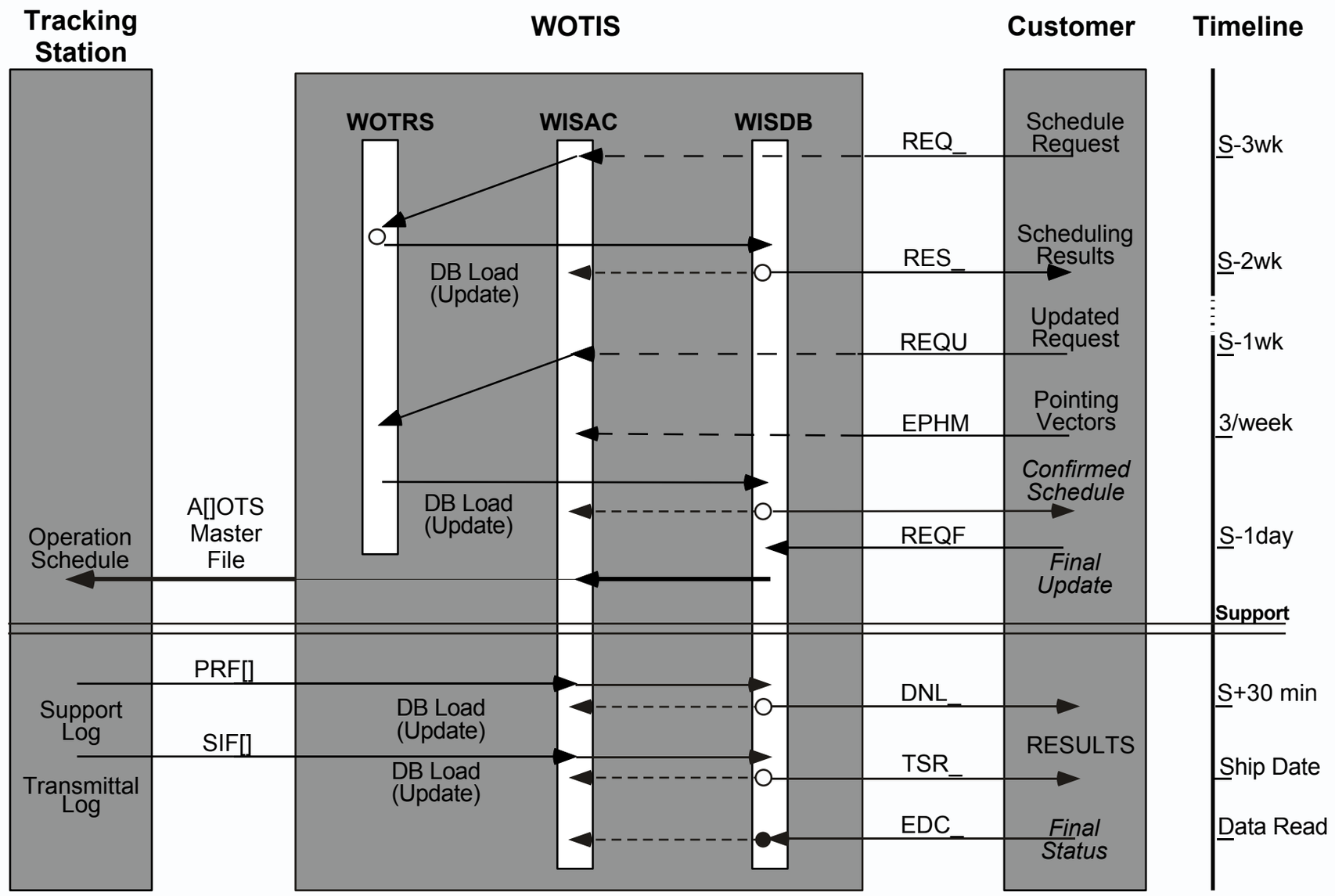
Wallops Orbital Tracking Information System (WOTIS) Operation

QuikSCAT/SNOE



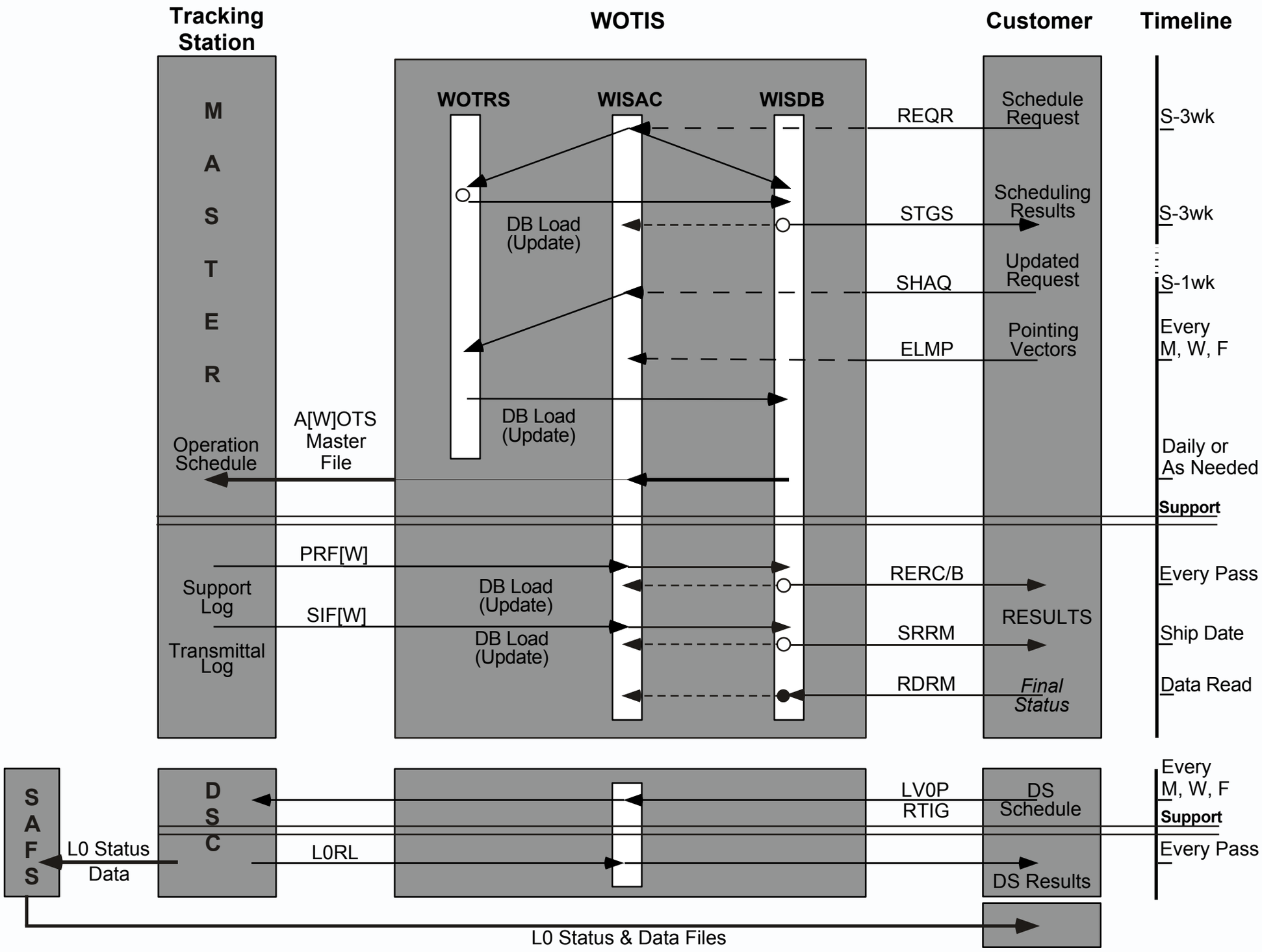
Wallops Orbital Tracking Information System (WOTIS) Operation

LANDSAT

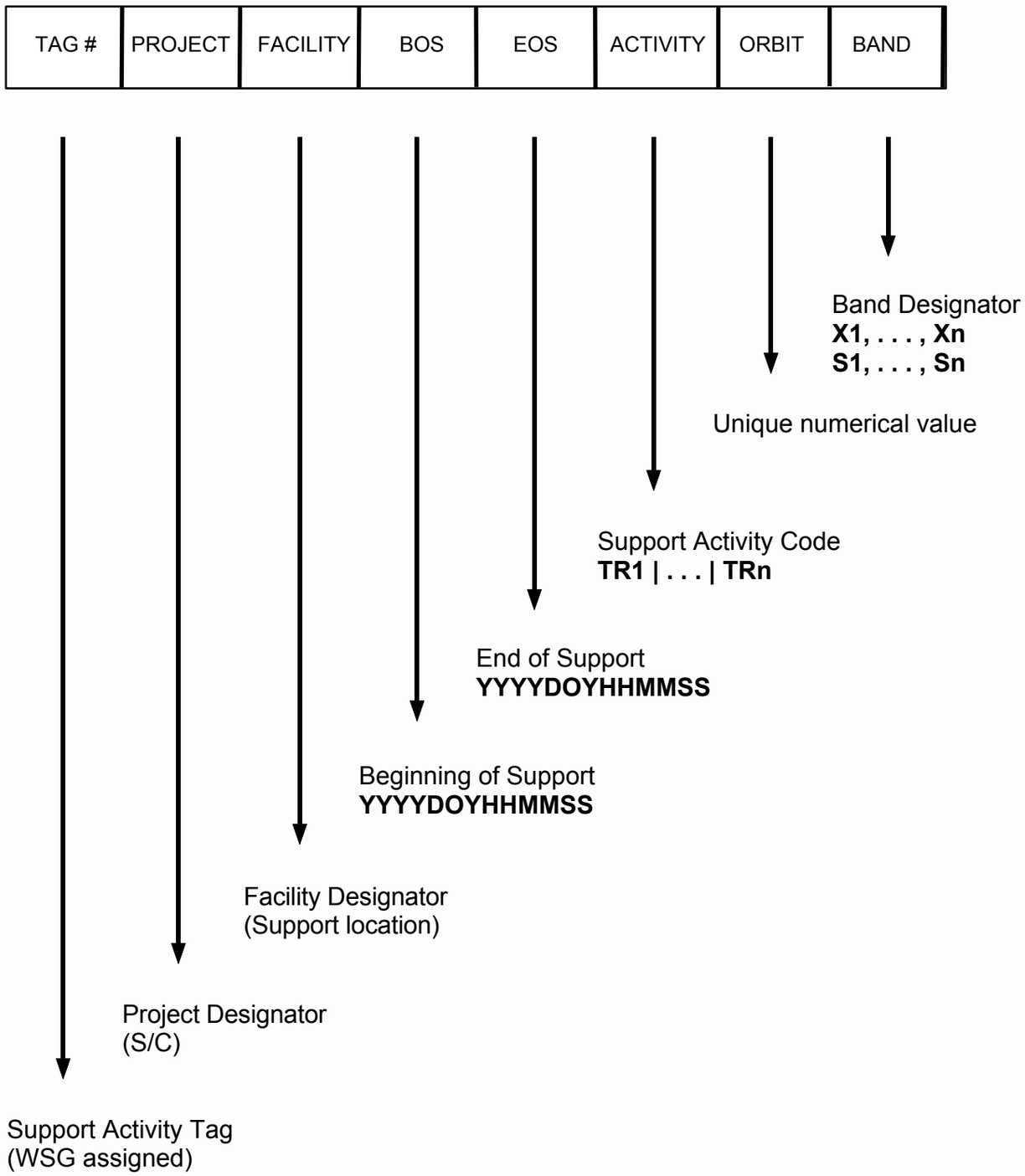


Wallops Orbital Tracking Information System (WOTIS) Operation

ADEOS II



Wallops Orbital Tracking Information System (WOTIS)
Comma-Delimited Request/Response Format



Wallops Orbital Tracking Information System (WOTIS)
WOTIS / GS File Interchange

WOTRS.MAS
WOTIS to A[ ]OTS Master

- Satellite ID
- Site ID
- Support Activity Tag (WOTRS Line Item)
- Operation (NON, SUP, PBK, TES, TWP, DWN)
- Antenna (Receive & Transmit)
- Track Start/Stop
- Event Start/Stop (Record or Process)
- Ranging (Y/N)
- Support Type (RCTD)
- Data Line
- Support Activity Code (TR##)
- Doppler Spec
- Voice Times
- Orbit Number
- P/B Tape ID
- P/B Start Address
- P/B End Address
- Downlink Band Specification
- Ephemeris (TOD, IIRV, Brouwer)
- Operator Remarks (WOTIS)

PRF[ ]
A[ ]OTS Master to WOTIS

- WOTRS Line Item (Customer Tag)
- Media ID (Tape Recording)
- Tape Recorder ID
- Tape Start/Stop Address
- Tape Start/Stop Time
- Recorder Quality
- Bit Sync Start/Stop Time
- Acquisition Status
- Event Designator (Operation)
- Tracked (Y/N)
- Recorded (Y/N)
- Telemetry Processor Stat #1
- Telemetry Processor Stat #2
- Telemetry Processor Stat #3
- Telemetry Processor Stat #4
- Telemetry Processor Stat #5
- Telemetry Processor Stream ID

SIF[ ]

- Media ID
- Conveyance
- Date

Wallops Orbital Tracking Information System (WOTIS)
Ground Station Pass Results File - PRF[ ]

1 - 10	11 - 25	26 - 35	36 - 45	46 - 62			63 - 79			80 - 96			97 - 113			114 - 118	119 - 121	122 - 126
WOTRS Line Item	**Tape #**	**Tape Start Add**	**Tape End Add**	**Tape Event Start**			**Tape Event End**			**Bit Sync Lock**			**Bit Sync Unlock**					
				Year	**Date**	**Time**	**Year**	**Date**	**Time**	**Year**	**Date**	**Time**	**Year**	**Date**	**Time**	**% Lock**	***Event Designator***	***Recorder ID***
Alpha	Alpha	Numeric	Numeric	Y	M D	H:M:S	Y	M D	H:M:S	Y	M D	H:M:S	Y	M D	H:M:S	%	Mnemonic	Alpha

General Format:
SSSRRxxxxxxxxxx, where
SSS = GS Designator
RR = Recorder Type
xxxxxxxxxx = 10 Character Tape Volume Label.

General Time Format
YYYYMMDD HH:MM:SS

1/sec Bit Sync & Demod Lock Count divided by # secs to be recorded (in Master Schedule) X 100. Number is %.

Event Designators 0-5 are scheduled (WOTRS) activities sent to the ground station. Numbers 6-9 are scheduled at the ground station. Results of all activities are returned to WISDB

0=None	NON
1=Support	SUP
2=Playback	PBK
3=Test	TES
4=Time Window P/B	TWP
5=Down	DWN
6=Special Support	SPS
7=Special Playback	SPP
8=Bit Error Test	BEX
9=Internal Rec Test	TST

127	128	129 - 133	134 - 143	144 - 153	154 - 163	164 - 173	174 - 183	184
Tracked	**Recorded**	**Recorder Quality**	**TP #1**	**TP #2**	**TP #3**	**TP #4**	**TP #5**	**TP Op**
Y/N	Y/N	%	Numeric	Numeric	Numeric	Numeric	Numeric	Alpha

If the sum of Az & El movement is < 10 degrees, Tracked = N (No); else Tracked = Y (Yes).

If Event Designator = SUP or SPS and End Address-Start Address < 200, Recorded = N (No); else Recorded = Y (Yes).

Telemetry Processor	**TP#1**	**TP#2**	**TP#3**	**TP#4**	**TP#5**	**TP Op**
AVTEC PTP Command	# Frames Xmitted	# Headers received	# Headers accepted	# Data Units sent	# Command echos	PTP Stream ID
AVTEC PTP Telemetry	# Bytes output to file of socket	Total # of frames received	# CRC errors (CCSDS)	# correctable Reed-Soloman frames (CCSDS)	# un-correctable Reed-Soloman frames (CCSDS)	PTP Stream ID
TSI Data Stripper (ADEOS S/C)	Total number of frames processed	Number of corrected frames	Number of uncorrected frames	Back_to_ Search count	Bit Error Rate	Downlink Band (X1|X2|X3)

GENERAL NOTES:

No Line Item will exist for Event Designator = BEX, TST, SPS.
Bit Sync fields are not applicable for Event Designator = BEX, TST, TWP, PBK

ALL TIMES:
H:M:S = UTC Time to the nearest second => Example 14:21:33
Y = 4 digit year => Example 1997
M D = 2 digit month followed by 2 digit day => Example 0205 is Feb 5

Wallops Orbital Tracking Information System (WOTIS)
Standard File Names

1a) Schedule Originating from User (Specific Scheduling - NOT recommended)

iU**b**B1**d**D.C

1) Schedule to User (Generic Scheduling, Initial File; Specific Scheduling, Response File)

sU**b**B1**d**D.C

2) Schedule Update Request from User

uU**b**B1**d**D.C

3) Final (daily) Schedule Update Request from User

fU**b**B1**d**D.C

4) Station Inviews in FDF (Satellite Toolkit) Format [If customer supplies]

vUB1.**psa** or **v**UB2.**psa**

5a) Ephemeris in FDF IIRV Format

ephmUB1 or **ephm**UB2

5b) Ephemeris as NORAD 2-Line Elements

nU.**tle**

6) Support Results

rU**b**B1**d**D.C

7) Tape Shipment

tU**b**B1.C

8) Tape Ingest Results
aU.C

U = User or Project, Produced by WISDB	> QUI
B1 = Starting Date of Data (YYYYDoY)	> 1997279
B2 = Starting Date of Data (YYYYMMDD)	> 19971006
D = Duration of Data (Days)	> 07
C = File Creation Time, used for uniqueness (hhmmss)	> 130524

Wallops Orbital Tracking Information System (WOTIS)
Schedule File

		Ground	Start Support			End Support			Activity		
Tag Number	**Satellite**	**Station**	**Year**	**DOY**	**Time**	**Year**	**DOY**	**Time**	**Code**	**Orbit**	**Band**
Alpha	Alpha	Alpha	Y	D	HMS	Y	D	HMS	Alpha	Numeric	Alpha

WFF assigned unique tag	Satellite name	WFF Ground Station	Start Time of scheduled support (not including track & record buffer)	End Time of scheduled support (not including track & record buffer)	Four character activity designator (e.g. TR1, PBK)	Orbit #	Frequency designator for support (e.g. X1, X2, S1). If blank, single S-band is assumed.

Downlink Data Rate	Doppler Specification	Support Type Ranging
Numeric	Alpha	5 integers

Rate in kb/s at which data are being downlinked from S/C	Specified as: 1W+1 way, 2W=2 way, 3W=3 way, Blank=none	5 individual operations: R,C,T,D,M See Note #1

Note #1:
There are 5 keywords represented in this field, 4 support types plus Ranging. These are communicated in a series of 5 integers which represent the presence (1) or absence (0) of each keyword:
R = Receive dump data from S/C (onboard recorder)
C = Send commands to S/C
T = Receive telemetry data (health/status) from S/C
D = Receive real-time data from S/C
M = Provide Ranging support

Items within dashed line are added to make Complete Form of file.
Portion outside dashed line is Short Form of file.

GENERAL NOTES:

Each field in file is separated from next with a comma (except for Y, D, H M in time fields).

SHORT and COMPLETE files have different file names for clear identification.

Names in **bold** are descriptive names

ALL TIMES:
Y = 4 digit year => Example 1997
D = 3 digit day of year (Jan 1=1) => Example 056
H M S = 6 digit UTC Time to nearest second => Example 142135

Wallops Orbital Tracking Information System (WOTIS)
Downlink Results File

		Ground					Start Record or P/B			Ene Record				
Tag Number	Satellite	Station	Operation	Tape #	Start Add	End Add	Year	DOY	Time	Year	DOY	Time	Orbit	Recorder
A/N	A/N	Alpha	Alpha	A/N	Numeric	Numeric	Y	D	H M S	Y	D	H M S	Numeric	A/N

- Tag Number: WFF assigned unique tag
- Satellite: Satellite name
- Ground Station: WFF Ground Station
- Operation: Operation reported: Support or Playback
- Tape #: Volume label of tape being reported
- Start Add / End Add: Start & End Address for operation being reported
- Start Record or P/B (Year, DOY, Time): Start Time of tape recording or playback reported
- Ene Record (Year, DOY, Time): End time or tape recording
- Orbit: Customer supplied Orbit #
- Recorder: Identification of tape recorder

Bit Sync Lock			Bit Sync Unlock						Telemetry Processor Data Quality						Recorder	
Year	DOY	Time	Year	DOY	Time	% Lock	Recorded	Tracked	Stream	Stat #1	Stat #2	Stat #3	Stat #4	Stat #5	Quality	Comments
Y	D	H M S	Y	D	H M S	%	Y/N	Y/N	A/N	Numeric	Numeric	Numeric	Numeric	Numeric	%	Alpha

- Bit Sync Lock: First time Bit Sync & Demod changed to lock status
- Bit Sync Unlock: Time Bit Sync & Demod changed to unlock status
- % Lock: See Note
  - 1/sec Bit Sync & Demod Lock Count divided by # secs to be recorded (in Master Schedule) X 100. Number is %
- Recorded: Pass recording success
- Tracked: Pass tracking success
- Recorder Quality: Recorder data quality
- Comments: Operator Comments

Telemetry Processor	Stat #1	Stat #2	Stat #3	Stat #4	Stat #5	Stream
AVTEC PTP Command	# Frames Xmitted	# Headers received	# Headers accepted	# Data Units sent	# Command echos	PTP Stream ID
AVTEC PTP Telemetry	# Bytes output to file of socket	Total # of frames received	# CRC errors (CCSDS)	# correctable Reed-Soloman frames (CCSDS)	# un-correctable Reed-Soloman frames (CCSDS)	PTP Stream ID
TSI Data Stripper (ADEOS S/C)	Total number of frames processed	Number of corrected frames	Number of uncorrected frames	Back_to_ Search count	Bit Error Rate	Downlink Band (X1|X2|X3)

GENERAL NOTES:

ALL TIMES:
Y = 4 digit year => Example 1997
D = 3 digit day of year (Jan 1=1) => Example 056
H M S = UTC Time to the nearest second => Example 142133

Each field in the file is separated from the next with a comma (except for Y,D,H M S in time fields). Since Comments are last, they may contain commas.
For Playback: End Record, Bit Sync Lock/Unlock, % Lock, Recorded, Tracked, and Data Quality Stats have no meaning nor values.

Wallops Orbital Tracking Information System (WOTIS)
Tape Shipment File

								Start Record or P/B			End Record				
Tag Number	**Satellite**	**Ground Station**	**Operation**	**Conveyance**	**Tape #**	**Start Add**	**End Add**	**Year**	**DOY**	**Time**	**Year**	**DOY**	**Time**	**Orbit**	**Comments**
Alpha	Alpha	Alpha	Alpha	Alpha	Alpha	Numeric	Numeric	Y	D	H M S	Y	D	H M S	Numeric	Alpha
WFF assigned unique tag	Satellite name	WFF Ground Station	Operation reported: Support (SUP), or Test (TST or BEX)	Designator for box in which tape is being shipped	Volume label of tape being reported	Start & End Address for operation being reported		Start Time of tape operation being reported			End Time of tape operation being reported			Customer supplied Orbit #	WFF Comments

GENERAL NOTES:

Each field in the file is separated from the next with a comma (except for Y,D,H M S in time fields). Since Comments are last, they may contain commas.
Names in **bold** are descriptive names.
No Tag Number will exist for Event Designator = BEX, TST, SPS. Orbit is not used when Operation type is Test.

ALL TIMES:
Y = 4 digit year => Example 1997
D = 3 digit day of year (Jan 1=1) => Example 056
H M S = UTC Time to the nearest second => Example 142133

Wallops Orbital Tracking Information System (WOTIS)
WOTRS Scheduling Logic